

CLAIMS

What is claimed is:

- 5 1. A clean equipment for removing polymer residues on sidewalls of metal lines, comprising:
 - a first bath containing a stripping solution for removing polymer residues on sidewalls of metal lines formed on a wafer;
 - a second bath containing an organic solvent for removing the stripping solution left on the wafer, said second bath being provided with a gas bubbler for providing gas flow and a lattice-like cassette stage for supporting cassettes for carrying the wafers, said gas bubbler positioned on the bottom of said second bath within said second bath and said lattice-like cassette stage positioned over said gas bubbler, wherein said gas bubbler comprises a main flow tube and at least two branching tubes, each said branching tube provided with a plurality of pairs of side flow tubes, and each said branching tube vertically communicated with said main flow tube, each pair of said side flow tubes correspondingly and vertically communicated with two opposite sides of said branching tube and parallel with said main flow tube, and a bubbling aperture of each said side flow tube positioned under a lattice of said lattice-like wafer carrier;
 - an overflow bath for providing water flow to remove away the organic solvent and the stripping solution left on the wafer; and
- 25 a dryer for drying water left on the wafer.
- 30 2. The clean equipment of claim 1, wherein a third bath is positioned between said second bath and said overflow bath, said third bath containing an organic solvent the same with that contained in said second bath for further removing the stripping solution left on the wafer.
- 35 3. The clean equipment of claim 1, wherein said third bath is

provided with a gas bubbler for providing gas flow and a lattice-like cassette stage for supporting cassettes for carrying the wafers, said gas bubbler positioned on the bottom of said third bath within said third bath and said lattice-like cassette stage positioned over said gas bubbler,
5 wherein said gas bubbler comprises a main flow tube and at least two branching tubes, each said branching tube provided with a plurality of pairs of side flow tubes, and each said branching tube vertically communicated with said main flow tube, each pair of said side flow tubes correspondingly and vertically communicated with two opposite
10 sides of said branching tube and parallel with said main flow tube, and a bubbling aperture of each said side flow tube positioned under a lattice of said lattice-like cassette stage.

4. The clean equipment of claim 1, wherein the stripping solution
15 comprises alcohol amine, water, dihydroxylbenzene, hydroxyl amine and anticorrosion agent.

5. The clean equipment of claim 1, wherein the organic solvent
comprises alcohol (ROH).

20 6. The clean equipment of claim 5, wherein the organic solvent
comprises methanol.

7. The clean equipment of claim 5, wherein the organic solvent
25 comprises isopropyl alcohol.

8. The clean equipment of claim 1, wherein said gas bubbler
positioned in said second bath is used for providing inert gas flow.

30 9. The clean equipment of claim 8, wherein said gas bubbler
positioned in said second bath is used for providing nitrogen gas flow.

10. The clean equipment of claim 3, wherein said gas bubbler positioned in said third bath is used for providing inert gas flow.

11. The clean equipment of claim 10, wherein said gas bubbler positioned in said third bath is used for providing nitrogen gas flow.

12. A clean station for removing polymer residues on sidewalls of metal lines, comprising:

10 a first stop provided with a stripping solution bath for removing polymer residues on sidewalls of metal lines formed on a wafer;

15 a second stop provided with a first organic solvent bath for removing the stripping solution left on the wafer, said first organic solvent bath being provided with a gas bubbler for providing gas flow and a lattice-like cassette stage for supporting cassettes for carrying the wafers, said gas bubbler positioned on the bottom of said first organic solvent bath within said first organic solvent bath and said lattice-like cassette stage positioned over said gas bubbler, wherein said gas bubbler comprises a main flow tube and at least two branching tubes, each said branching tube provided with a plurality of pairs of side flow tubes, and each said branching tube vertically communicated with said main flow tube, each pair of said side flow tubes correspondingly and vertically communicated with two opposite sides of said branching tube and parallel with said main flow tube, and a bubbling aperture of each said side flow tube positioned under a lattice of said lattice-like wafer carrier;

20 a third stop provided with an overflow bath for providing water flow to remove away the first organic solvent and the stripping solution left on the wafer; and

25 a fourth stop provided with a dryer for drying water left on the wafer.

30 13. The clean station of claim 12, wherein a fifth stop is

positioned between said second stop and said third stop, said fifth stop provided with a second organic solvent bath containing a second organic solvent the same with that contained in said first organic solvent bath for further removing the stripping solution left on the wafer.

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14. The clean station of claim 13, wherein said second organic solvent bath is provided with a gas bubbler for providing gas flow and a lattice-like cassette stage for supporting cassettes for carrying the wafers, said gas bubbler positioned on the bottom of said second organic solvent bath within said second organic solvent bath and said lattice-like cassette stage positioned over said gas bubbler, wherein said gas bubbler comprises a main flow tube and at least two branching tubes, each said branching tube provided with a plurality of pairs of side flow tubes, and each said branching tube vertically communicated with said main flow tube, each pair of said side flow tubes correspondingly and vertically communicated with two opposite sides of said branching tube and parallel with said main flow tube, and a bubbling aperture of each said side flow tube positioned under a lattice of said lattice-like cassette stage.

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15. The clean station of claim 12, wherein the stripping solution comprises alcohol amine, water, dihydroxylbenzene, hydroxyl amine and anticorrosion agent.

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16. The clean station of claim 12, wherein the first organic solvent comprises alcohol (ROH).

17. The clean station of claim 16, wherein the first organic solvent comprises methanol.

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18. The clean station of claim 16, wherein the first organic solvent comprises isopropyl alcohol.

19. The clean station of claim 13, wherein the second organic solvent comprises alcohol (ROH).

5 20. The clean station of claim 19, wherein the second organic solvent comprises methanol.

10 21. The clean station of claim 19, wherein the second organic solvent comprises isopropyl alcohol.

15 22. The clean station of claim 12, wherein said gas bubbler positioned in said first organic solvent bath is used for providing inert gas flow.

20 23. The clean station of claim 22, wherein said gas bubbler positioned in said first organic solvent bath is used for providing nitrogen gas flow.

25 24. The clean station of claim 13, wherein said gas bubbler positioned in said second organic solvent bath is used for providing inert gas flow.

25 25. The clean station of claim 24, wherein said gas bubbler positioned in said second organic bath is used for providing nitrogen gas flow.

26. A method for removing polymer residues on sidewalls of metal lines, comprising:

30 providing a wafer with at least a metal line layer formed thereon, the sidewalls of the metal lines of the metal line layer having polymer residues formed thereon;

 immersing said wafer in a stripping solution for removing the

polymer residues in accordance with a first immersion time;

removing said wafer from said stripping solution and maintaining for a first time so that said stripping solution left on said wafer drips down;

5 immersing said wafer in a first organic solvent for removing said stripping solution left on said wafer in accordance with a second immersion time;

removing said wafer from said first organic solvent and maintaining for a second time so that said striping solution and said first
10 organic solvent left on said wafer drip down;

immersing said wafer in a water flow for removing the stripping solution and said first organic solvent left on said wafer in accordance with a third immersion time; and

15 removing water left on said wafer in accordance with a predetermined time.

27. The method of claim 26, wherein said first immersion time is about 10 minutes.

20 28. The method of claim 26, wherein said first time is about 100 seconds.

29. The method of claim 26, wherein said second immersion time is about 5 minutes.

25 30. The method of claim 26, wherein said second time is about 50 seconds.

31. The method of claim 26, wherein said third immersion time is about 10 minutes.

32. The method of claim 26, wherein said predetermined time is

about 10 minutes.

33. The method of claim 26, wherein said stripping solution comprises alcohol amine, water, dihydroxylbenzene, hydroxyl amine and
5 anticorrosion agent.

34. The method of claim 26, wherein said first organic solvent comprises alcohol (ROH).

10 35. The method of claim 34, wherein said first solvent comprises methanol.

36. The method of claim 34, wherein said first solvent comprises isopropyl alcohol.

15 37. The method of claim 26, wherein prior to immersing said wafer in said water flow, further comprising immersing said wafer in a second organic solvent for further removing said stripping solution left on said wafer in accordance with a fourth immersion time, and removing
20 said wafer from said second organic solvent and maintaining for a third time so that said stripping solution, said first organic solvent and said second organic solvent drip down.

25 38. The method of claim 37, wherein said fourth immersion time is about 5 minutes.

39. The method of claim 37, wherein said third time is about 50 seconds.

30 40. The method of claim 37, wherein said second organic solvent comprises alcohol (ROH).

41. The method of claim 40, wherein said second organic solvent comprises methanol.

42. The method of claim 40, wherein said second organic solvent
5 comprises isopropyl alcohol.

43. The method of claim 26, wherein further comprising providing an inert gas flow in said first organic solvent.

10 44. The method of claim 43, wherein said inert gas flow comprises nitrogen gas flow.

15 45. The method of claim 43, wherein the flow rate of said inert gas flow is about 15 liters/per minute.

46. The method of claim 44, wherein the flow rate of said nitrogen gas flow comprises 15 liters/per minute.

20 47. The method of claim 37, wherein further comprising providing an inert gas flow in said second organic solvent.

48. The method of claim 47, wherein said inert gas flow comprises nitrogen gas flow.

25 49. The method of claim 47, wherein the flow rate of said inert gas flow is about 15 liters/per minute.

50. The method of claim 48, wherein the flow rate of said nitrogen gas flow is about 15 liters/per minute.